

TABLE VI. CIRCUMNEUTRAL SOIL PLANTS (CALCICOLES).

(Observed in northern Vermont and New Hampshire, 1919.)

- Cryptogramma Stelleri* (Gmel.) Prantl (*Pellaea gracilis* Hook.).
Cystopteris bulbifera (L.) Bernhardt (*Filix bulbifera* Underwood).
Woodsia glabella R. Br.
 “ *alpina* (Bolton) S. F. Gray (*W. hyperborea* R. Br.).
Asplenium Ruta-muraria L.
Thuja occidentalis L. (Also in subacid soils high in calcium salts.)
Smilacina stellata Desf. (*Vagnera Morong*).
Anemone riparia Fernald.
Caltha palustris L.
Braya humilis (C. A. Mey.) Robinson.
Saxifraga aizoon Jacq.
 “ *aizoides* L.
 “ *oppositifolia* L.
Parnassia caroliniana Michx.
Astragalus Blakei Eggleston.
Primula mistassinica Michx.
Campanula rotundifolia. (Also in subacid soils high in calcium salts.)

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THE AMERICAN VARIETIES OF *PYROLA CHLORANTHA*.

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To one who has been familiar with the large-flowered *Pyrola chlorantha* which occurs in scattered colonies through dry woods of southern New England, southern New York and Pennsylvania, it often seems strange that the smaller-flowered plant of northern New England and adjacent regions is conspecific with it. The common plant of eastern Massachusetts, for example, has numerous rounded leaves which make a conspicuous rosette, the blades often 3–4.5 cm. broad and nearly as long, and the greenish-white petals 6.5–9 mm. long and comparatively broad (3.5–6 mm.). This is the plant described by Barton in 1815 as *P. convoluta*.¹ In the White Mountains and across the northern half of Maine, on the other hand, *P. chlorantha* is often quite leafless or has only a few leaves, these inclined

¹ Barton, Fl. Phil. Prodr. 50 (1815).

to have somewhat wedge-shaped small blades (0.7–2.5 cm. long and broad), and the petals of this mountain plant are only 4–6 mm. long and 2.5–4 mm. broad. These are the superficial differences between the two plants, but close study reveals others. The large-leaved, large-flowered, more southern plant has a broader calyx, 4.8–6 mm. broad with lobes 1.2–2 mm. long, the plant of northern New England having a calyx 3–4 mm. broad, with lobes 0.5–1 mm. long. The anthers of the more southern plant are 3–4, of the more northern 1.6–2.6 mm. long, and the mature style (in fruiting specimens) of the southern is 8–10, of the northern 5–7 mm. long.

If these two were the only representatives we had of *Pyrola chlorantha*, they would seem abundantly distinct. But north of the range of either, though slightly overlapping into the range of each, there is a third trend which combines their characteristics. This plant with numerous rounded leaves forming a conspicuous rosette superficially resembles Barton's *P. convoluta*, but the leaf-blades are commonly smaller, while the calyx, petals, anthers and style more nearly approach in their measurements the few-leaved plant with usually cuneate small blades. This more northern intermediate plant, ranging from Newfoundland and "Labrador" to Mackenzie and south very locally to New England, the Great Lake Region, the Black Hills, Arizona and Oregon, is typical *P. chlorantha*, inseparable apparently from the plant of northern Eurasia.

In the Rocky Mountain region occurs a somewhat characteristic extreme with elliptic or oblong-ovate leaf-blades but seeming to differ in no other character from typical *P. chlorantha*. This plant was considered by Dr. Gray identical with *P. occidentalis* R. Br. from the Behring Sea region and treated as *P. chlorantha*, var. *occidentalis* (R. Br.) Gray.¹ It is highly improbable, however, that the two are identical, Andres, who has devoted years to a study of *Pyrola*, stating² that the sepals of *P. occidentalis* are larger than in *P. chlorantha* and publishing a silhouette of an Alaskan specimen which shows a rounder blade than in the elliptic-leaved Rocky Mountain plant.

In the West, too, certain plants commonly referred to *P. chlorantha* are equally close to *P. picta* Sm. These perplexing plants are all from the area in which the latter species occurs and may represent

¹ Gray, Syn. Fl. N. A. ii. pt. 1, 47 (1878).

² Andres, Allgem. Bot. Zeitschr. xix. 82 (1914).

a hybrid with that polymorphous species. The writer attempts no solution of their status.

The American varieties of *Pyrola chlorantha* may be distinguished by the following key:

Calyx 3–4 (rarely 5) mm. broad: petals 4–6.5 mm. long, 2.5–4 mm. broad: anthers 1.6–3 (rarely 3.3) mm. long: mature style 5–7 mm. long.

Leaves rounded to base and apex, rather numerous (4–11) in a rosette: calyx-lobes deltoid-ovate to ovate-oblong, usually longer than or as long as broad, 0.8–1.7 mm. long: anthers 2.3–3.3 mm. long.

Leaf-blades mostly orbicular, suborbicular, reniform or ovate; the larger 1.5–3.3 cm. broad.....*P. chlorantha* (typical).

Leaf-blades mostly elliptic or oblong-ovate; the larger 0.9–1.7 cm. broad.
var. *saximontana*.

Leaves mostly cuneate at base and truncate or subtruncate at summit, somewhat flabelliform-obovate, few (1–7 or even wanting) in a rosette; the larger 0.7–2.5 cm. broad and long: calyx-lobes broadly deltoid, mostly broader than long, 0.5–1 mm. long: anthers 1.6–2.6 mm. long.

var. *paucifolia*.

Calyx 4.8–6 mm. broad; its lobes 1.2–2 mm. long: petals 6.5–9 mm. long, 3.5–6 mm. broad: anthers 3–4 mm. long: mature style 8–10 mm. long: leaf-blades rounded at base; the larger ones 2–4.5 cm. broad.

var. *convoluta*.

P. CLORANTHA Sw. Sv. Vet.-Akad. Nya Handl. xxxi. 190 (1810).—Dry or dryish woods, southeastern and central Newfoundland and “Labrador” to Mackenzie, south to Nova Scotia, and locally to s. Maine, e. Cape Cod and w. Massachusetts, (?) Hartford Co., Connecticut, w. Ontario, Wisconsin, Black Hills, South Dakota, and among the mts. to Arizona and Oregon. Europe and northern Asia.

Var. **saximontana**, n. var., foliis plerumque ellipticis vel oblong-ovatis, majoribus 0.9–1.7 cm. latis.—Montana to New Mexico. MONTANA: descent to Ross’ Hole, 1880, *S. Watson*, no. 260; Yellow Bay, Flathead L., 1908, *Mrs. J. Clemens* (TYPE in Gray Herb.). WYOMING: Cache Creek, Yellowstone Park, 1885, *Tweedy*, no. 918; Leigh’s Lake, 1901, *Merrill & Wilcox*, no. 1120. COLORADO: Minnehaha, alt. 2600 m., 1901, *Clements*, no. 238. NEW MEXICO: Winsor Creek, Pecos Nat. Forest, 1908, *Standley*, no. 4227, in part.

Var. **paucifolia**, n. var., foliis nullis vel paucis (1–7) plerumque flabellato-obovatis truncatis vel subtruncatis basi cuneatis, rare ovatis vel subreniformibus, majoribus 0.7–2.5 cm. longis latisque; calycibus 3–4 mm. latis, lobis late deltoideis 0.5–1 mm. longis; petalis 4–6 mm. longis, 2.5–3.5 mm. latis; antheris 1.6–2.6 mm. longis; stylo maturo 5–7 mm. longo.—Cape Breton to w. Ontario, s. to n. and w. New England, n. New York and locally to mts. of Pennsylvania. PRINCE EDWARD ISLAND: Alberton, 1912, *Fernald & St. John*, no. 7886. NEW BRUNSWICK: gorge of Aroostook R., 1902, *Williams, Collins & Fernald*. NOVA SCOTIA: Smoky Mt., Cape Breton, 1914, *Nichols*, no. 868; Lake Warren, Ingonish, Cape Breton, 1904, *Churchill*; Truemanville, 1884, *Trueman*; Pictou, 1907, *C. B. Robinson*, no. 592.

MAINE: St. Francis, 1881, *Furbish*; Orono, 1892, *Fernald*; near Mt. Katahdin, 1900, *Churchill*; Rum Mt., 1895, *Fernald*; Russell Mt., Blanchard, 1897, *Fernald*; Dover, 1895, *Fernald*; Mt. Bigelow, 1915, *Knowlton*; Farmington, 1915, *Knowlton*; Rangeley, 1894, *Furbish*; Buckfield, 1878, *Allen*; Hartford, 1892, *Parlin*; Dedham, 1916, *Fernald & Long*, no. 14,281; Orland, *Atkins*; Mt. Megunticook, Camden, 1913, *Fernald*, no. 10,120; South Poland, 1893, 1894, *Furbish*. NEW HAMPSHIRE: near summit of Mt. Clinton, 1894, *T. O. Fuller*; Mt. Resolution, Sargent's Purchase, 1912, *Pease*, no. 14,044; n. peak of Mt. Hope, Hadley Grant, 1915, *Pease*, no. 16,495; Shelburne, *C. E. Faxon*; Randolph, 1893, *Williams*, 1908, *Pease*, no. 11,417; Dalton Mt., Dalton, 1914, *Pease*, no. 16,094; Mt. Prospect, Lancaster, 1913, *Pease*, no. 14,214; Woodstock, 1915, *Fernald*, no. 11,833; Atwell Hill, Piermont, July 26, 1910, *E. F. Williams* (TYPE in Gray Herb.); Breezy Point, Warren, 1907, *Williams*; Gilmanton, 1907, *Cushman & Sanford*, no. 1271. VERMONT: Willoughby, 1896, *Kennedy*; Townshend, 1914, *Wheeler*; mountain slope, Manchester, 1898, *Day*, no. 114. MASSACHUSETTS: Buckland, 1904, *Forbes*; Great Barrington, 1901, *Hoffmann*. CONNECTICUT: Bolton, *Weatherby*. NEW YORK: Stony Creek Ponds, Adirondack Mts., 1899, *Rowlee, Wiegand & Hastings*. PENNSYLVANIA: Ponoco Plateau, 1904, *Harshberger*. ONTARIO: Nipigon L., 1912, *Pulling*. MICHIGAN: Black R., 1868, *Gillman*; Keweenaw Co., 1890, "rare," *Farwell*, no. 304.

Var. *paucifolia*, it will be seen from the above stations, is particularly characteristic of the upland regions of northern New England, often ascending nearly to timber-line. In most of this area it is the only variant known, but eastward, in the Maritime Provinces, it meets typical *P. chlorantha* and is sometimes associated with it and southward its boundaries approach the northern limits of var. *convoluta*. In the Northwest, in British Columbia and Washington, occurs a form of *P. chlorantha* strongly suggesting var. *paucifolia* but with more rounded leaf-blades. The scanty material at hand is too inadequate and this form is for the present left with true *P. chlorantha*.

Var. **convoluta** (Barton), n. comb. *P. convoluta* Barton, Fl. Philad. Prodr. 50 (1815). ? *P. cordata* Andres, Allgem. Bot. Zeitschr. xix. 82 (1913).—Southeastern and centr. Maine to Maryland and Nebraska.

In its comparatively large petals and leaves var. *convoluta* somewhat suggests small plants of *P. americana* Sweet, but it has all the technical points of *P. chlorantha*. In his original publication Barton described *P. convoluta* merely by contrasting it with *P. americana*

(*P. rotundifolia* of Barton). Similarly, in describing his *P. cordata*, Andres compares his plant with *P. americana*, but says that it has the "Blüten . . . *chlorantha*-ähnlich . . . vielleicht nur eine geographische Rasse derselben." While typical *P. chlorantha* in America belongs chiefly in the Canadian region, and var. *paucifolia* primarily to the mountain-slopes of northern New England and adjacent regions, var. *convoluta* is a more southern extreme which does not ascend to noteworthy altitudes.

GRAY HERBARIUM.

NOTES ON POGONIA TRIANTHOPHORA.

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OF all the *Orchidaceae* found in the region about Asquam Lake, New Hampshire, *Pogonia trianthophora* (Sw.) BSP. is without doubt the most interesting. It was first reported in 1898 when a single station was found. Now there are six known stations, scattered over a comparatively small area, and containing between five and ten thousand plants. An intensive study of the plant began in 1917, and after three years of observation it is possible to note the following facts.

An unusual feature is the close colonial manner of growth, twenty to forty plants occurring within a square foot. These colonies are found in pockets or hollows in beech woods, which are filled with the decaying leaf-mold without soil. Late in July or early August the little pointed tip of the lowest leaf makes its appearance. Under favorable weather conditions the stem lengthens rapidly, and in a week the flowers are borne. The flowers are *erect*, white (rarely pink), the anther deep magenta.

Fertilization, which is rare, is effected by a species of small bee (*Halictus quadrimaculatus*). The bee forces his way into the blossom, hitting the anther as he goes, and loosening but not detaching it. As he backs out, the pollinia adhere to his thorax. The flower then nods and becomes a pale buff color. The seed rarely ripens at Squam Lake.